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TAXONOMY AND NOMENCLATURE OF SOME
POCKET GOPHERS FROM SOUTHEASTERN
ARIZONA

KENNETH I. LANGE, *c/o* U. S. National Museum

This paper is based upon a taxonomic and distributional study of pocket gophers in southeastern Arizona, namely, Cochise County, Santa Cruz County, and the eastern third of Pima County. Because of the marked sexual dimorphism of pocket gophers, a holotype and an allotype have been designated for each new form. Measurements are in millimeters and color standards are after Ridgway (1912). The following abbreviations are used in the lists of specimens examined:

BS—Biological Surveys Collection of the Fish and Wildlife Service, U. S. National Museum, Washington, D. C.

KU—Museum of Natural History, University of Kansas, Lawrence.

UA—Department of Zoology, University of Arizona, Tucson.

UI—Museum of Natural History, University of Illinois, Urbana.

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Two species of pocket gophers, *Thomomys bottae* and *Thomomys umbrinus*, are believed to occur within the study area (Lange, MS., Univ. Ariz. Libr., 1958). *T. bottae* is represented by nine subspecies and *T. umbrinus* by the following two:

Thomomys umbrinus intermedius Mearns

Thomomys fulvus intermedius Mearns, Proc. U. S. Nat. Mus., 19:719, July 30, 1897, type from summit of the Huachuca Mountains, 9,000 feet, Cochise County, Arizona.

Thomomys burti Huey, Trans. San Diego Soc. Nat. Hist., 7:158, July 28, 1932, type from Madera Canyon, 6,000 feet, Santa Rita Mountains, Santa Cruz County, Arizona.

Thomomys umbrinus intermedius, Nelson and Goldman, Jour. Mamm., 15:117, May 16, 1934.

Thomomys umbrinus burti, Nelson and Goldman, Jour. Mamm., 15:117, May 16, 1934.

Thomomys burti burti, Burt and Campbell, Jour. Mamm., 15:151, May 16, 1934.

Thomomys umbrinus burti, Goldman, N. A. Fauna 59:34, June 12, 1947.

Thomomys umbrinus intermedius, Goldman, N. A. Fauna 59:35, June 12, 1947.

Thomomys bottae proximus, Hoffmeister and Goodpaster, Ill. Biol. Monog., 24(1):98, December 31, 1954 [in part; specimens from Canelo Gate and one mile north of Fort Huachuca].

Thomomys umbrinus quercinus Burt and Campbell

Thomomys burti quercinus Burt and Campbell, Jour. Mamm., 15:150, May 16, 1934, type from Pena Blanca Spring, 4,500 feet, near Mexican boundary, north of monument 128, Pajarito Mountains, Santa Cruz County, Arizona.

Thomomys umbrinus quercinus, Goldman, N. A. Fauna 59:35, June 12, 1947.

Burt and Campbell (Jour. Mamm., 15:150, 1934) distinguished *quercinus* from *burti* (*T. burti burti* = *T. umbrinus burti*) in the following manner: ". . . color of sides distinctly paler with a yellowish instead of a deep chestnut cast; dark median dorsal stripe less pronounced and extending only to the rump. Skull differs in slightly larger size; larger interparietal; termination of nasals farther anteriorly with respect to the zygomatic arm of the maxillary . . .; pterygoids, as viewed from ventral surface, weaker and V-shaped instead of U-shaped as in *burti*, and lacking the distinct process which projects laterally and ventrally from each wing in *burti*." Examination of the available material reveals that of these characters the following will distinguish *quercinus*, known only from the type locality, from *burti* from the Santa Rita and Patagonia mountains: color of the sides; less pronounced dorsal stripe; in most specimens, the more anterior termination of the nasals; and the nature of the pterygoids.

Gophers referable to *T. umbrinus* from the Huachuca Mountains, however, exhibit intergradation between *quercinus* and *burti*. Specimens of *T. umbrinus* from Brown Canyon, from eight miles west of Fort Huachuca, and from one mile north, four miles west of Fort Huachuca resemble *quercinus* on the basis of the pterygoids; some resemble *quercinus* while others are like *burti* in nasal termination; and the specimens from eight miles west of the Fort resemble both *quercinus* and *burti* in pelage color, whereas specimens from Brown Canyon and from the Santa Rita Mountains are indistinguishable in pelage color.

The type specimen of *T. fulvus intermedius* (= *T. umbrinus intermedius*) exhibits the same morphological features indicative of intergradation between the more definable *quercinus* and *burti*: this specimen is like *quercinus* in the nature of the pterygoids; is almost intermediate in respect to nasal termination; and resembles *burti* from the Santa Ritas in pelage color, being only slightly darker on the dorsum and only slightly deeper Hazel on the sides. It measures as follows: total length, 200; tail, 66; hindfoot, 26; basilar length, 31.6; least interorbital constriction, 6.9; mastoidal breadth, 16.4; length of nasals,

12.1; breadth of rostrum, 7.1; length of rostrum, 16.0; alveolar length of maxillary toothrow, 7.3; and palato-frontal depth, 14.3.

Pocket gophers referable to *T. umbrinus* from the Santa Ritas and Patagonias and those from the Huachuclas are thus placed under one subspecies, viz., *intermedius*. These areas and Pena Blanca Spring are the only localities from which *T. umbrinus* is known in Arizona at the present time. The species *umbrinus* has not been reported from Sonora, Mexico; the subspecies *quercinus* is known only from Pena Blanca Spring. However, *quercinus* may have a larger range than is presently known: it may range through oaks (the usual habitat of *T. umbrinus* in Arizona) from Pena Blanca Spring into Sonora on the south and west sides of the Santa Cruz Valley and come back into Arizona in such localities as the oak zone of the Huachucla Mountains. Further, *T. umbrinus* may range through oaks from the Santa Rita and Patagonia mountains to the Huachuclas. Gene exchange between these gophers might be taking place by such a route. Although the type specimen of *intermedius* comes from an aspen and spruce zone, the preferred habitat of *T. umbrinus* appears to be in the vicinity of oak growth.

The following specimens are referred to *T. u. intermedius*. Total, 41, distributed as follows: *Pima County*: Santa Rita Mts.: NW slope, 1-1-½ m. S, 1-1-½ m. E Old Parker Ranch, 4,300-4,500 ft., 5 (KU); 9-½ m. SE Continental [near mouth Madera Canyon], 4,300 ft., 2 (KU); Madera Canyon, 4,600 ft., 4 (KU); Madera Canyon, 5,000 ft., 4 (KU). *Santa Cruz County*: Santa Rita Mts.: Madera Canyon, 6,000 ft., 1 (KU); Madera Canyon, 6,200 ft., 1 (KU); Agua Caliente Canyon, 7-½ m. E Amado, 4,500 ft., 4 (UA). Patagonia Mts.: 1 m. E Guajolote Corral, 5 m. N, 13 m. E Nogales, 5,500 ft., 1 (KU); Guajolote Corral, 5 m. N, 12 m. E Nogales, 5,800 ft., 1 (KU). *Cochise County*: Huachucla Mts.: summit, 9,000 ft., 1 (BS); E slope, Brown Canyon (between Ramsay Canyon and Ft. Huachucla Reservation), 5,700 ft., 3 (KU); Brown Canyon, 5,400 ft., 2 (KU); Brown Canyon, 5,300 ft., 6 (KU); W slope, Panama Mine, Canelo Gate (= 8 m. W Ft. Huachucla), 5 (UI); 1 m. N, 4 m. W Ft. Huachucla, 1 (UI).

Hoffmeister and Goodpaster (Ill. Biol. Monog., 24:95, 1954) believe that: “. . . in the Huachuclas, and perhaps in all of southern Arizona, gophers regarded as *T. umbrinus* by Goldman (1947) are best referred to *T. bottae*.” (If these two forms are conspecific, the earliest name would be *T. umbrinus*). They thus refer specimens of gophers from the northwest slope of Carr Peak, 8,400 feet, to the species *T. bottae* and to the subspecies *T. bottae intermedius* Mearns, regarding *T. fulvus intermedius* Mearns as a synonym. However, *T. bottae* and *T. umbrinus* are now believed to be distinct, and, accordingly, *T. fulvus intermedius* Mearns (*T. umbrinus intermedius* Mearns) is retained. A new name thus becomes necessary for the Carr Peak population of *T. bottae*. This form is named and described as follows.

Thomomys bottae carri, new subspecies

Thomomys bottae intermedius, Hoffmeister and Goodpaster, Ill. Biol. Monog., 24(1):95, December 31, 1954 (not *Thomomys fulvus intermedius* Mearns).

Holotype:—Male, skin and skull, no. 4185, University of Illinois, Department of Zoology, Urbana, Illinois; Huachuca Mountains, northwest slope, Carr Peak, 8,400 feet, Cochise County, Arizona; collected by Richard G. Van Gelder, original number 183.

Allotype:—Female, skin and skull, no. 4186, University of Illinois, Department of Zoology, Urbana, Illinois; Huachuca Mountains, northwest slope, Carr Peak, 8,400 feet, Cochise County, Arizona; collected by Donald F. Hoffmeister, original number 1544.

Description:—A relatively small form for the study area. Study material consisted of eight males and four females. The holotype measures as follows: total length, 220; tail length, 60; hindfoot, 30; basilar length, 31.4; zygomatic breadth, 22.1; least interorbital constriction, 6.3; mastoidal breadth, 16.6; length of nasals, 12.4; breadth of rostrum, 7.3; length of rostrum, 16.3; alveolar length of maxillary tooththrow, 7.5; and palato-frontal depth, 15.1. In the same order, the males, including the holotype, give average, minimum, and maximum measurements as follows (only five measurements of zygomatic breadth; seven of mastoidal breadth; seven of nasal length; and seven of rostral length): 209.3 (190-220); 62.1 (50-71); 28.5 (26-30); 31.8 (30.2-33.2); 22.3 (21.9-23.6); 6.6 (6.2-6.9); 16.7 (16.0-17.6); 12.7 (11.7-13.7); 7.4 (6.9-8.0); 16.0 (15.4-16.4); 7.6 (6.9-8.2); and 14.1 (13.3-15.1). The allotype measures as follows: total length, 215; tail length, 60; hindfoot, 28; basilar length, 30.0; zygomatic breadth, 21.3; least interorbital constriction, 6.4; mastoidal breadth, 16.4; length of nasals, 11.9; breadth of rostrum, 7.6; length of rostrum, 15.3; alveolar length of maxillary tooththrow, 7.7; and palato-frontal depth, 13.1. In the same order, the females, including the allotype, give average, minimum, and maximum measurements as follows (only two measurements of zygomatic breadth): 203.3 (190-215); 63.5 (59-68); 28.0 (25-30); 29.6 (28.6-31.2); 20.7 (20.0-21.3); 6.5 (6.1-7.1); 16.3 (15.7-17.0); 12.0 (10.9-13.2); 7.0 (6.5-7.6); 15.3 (14.4-16.5); 7.6 (7.4-7.9); and 13.3 (12.6-14.2).

These gophers have grayish dorsums and sides with varying expression of a bright pigment. The bright pigment, between Ochraceous-Tawny and Sayal-Brown, is conspicuous in two males and noticeable in one male and one female, these individuals being less overlaid with gray and resembling *T. b. hueyi* from the Rincon Mountains, Pima County, in pelage color. The remaining five males and three females of *T. b. carri* are not as bright as *T. b. hueyi* and not as dark as *T. b. catalinae* from the Santa Catalina Mountains, Pima County.

Comparisons:—In comparison with *T. b. proximus*, the race of *T. bottae* inhabiting the middle elevations of the Huachuca and Santa Ritas,

T. b. carri differs in: braincase less inflated; skull less rounded, more flattened; and pelage color less variable. *T. b. carri* differs from *T. b. hueyi* in the following features: zygomatic arches not curved; auditory bullae inflation more variable, both dorsoventral and lateral in *carri*, tending to be lateral in *hueyi*; and in most specimens, pelage not as bright. There is also an indication of sexual dimorphism in pelage color and skull curvature in *hueyi*, which is lacking in *carri*: the bright pigment in *hueyi* tends to be less conspicuous on the sides of the females and the skulls of male *hueyi* tend to have a greater curvature than those of the females. From *T. b. catalinae*, *carri* differs in: zygomatic arches not curved; auditory bullae inflation more variable; and brighter pelage.

Remarks:—This subspecies is known only from the type locality. See Hoffmeister and Goodpaster (1954:96-98) for notes on habitat and habits and for a photograph of the trapping locality.

Specimens examined:—Total, 12: Cochise County, Arizona; Huachuca Mountains, northwest slope, Carr Peak, 8,400 feet (UI).

Study of pocket gophers from southeastern Arizona revealed another population sufficiently distinct to warrant subspecific recognition. This race of *T. bottae* is named and characterized as follows.

***Thomomys bottae caneloensis*, new subspecies**

Holotype:—Male, skin and skull, no. 51788, University of Kansas, Museum of Natural History, Lawrence, Kansas; Huachuca Mountains, west foothills, Canelo, 10 miles south of Elgin, 5,100 feet, Santa Cruz County, Arizona; collected by G. H. Heinrich, original number 5551.

Allotype:—Female, skin and skull, no. 51786, University of Kansas, Museum of Natural History, Lawrence, Kansas; Huachuca Mountains, west foothills, Canelo, 10 miles south of Elgin, 5,100 feet, Santa Cruz County, Arizona; collected by G. H. Heinrich, original number 5549.

Description:—A large subspecies for the study area. Study material consisted of five males and seven females. The holotype measures as follows: total length, 228; tail, 68; hindfoot, 30; basilar length, 37.0; zygomatic breadth, 26.6; least interorbital constriction, 6.5; mastoidal breadth, 21.3; length of nasals, 13.5; breadth of rostrum, 8.9; length of rostrum, 16.5; alveolar length of maxillary tooththrow, 7.4; and palato-frontal depth, 15.7. The males, including the holotype, give average, minimum, and maximum measurements as follows: total length, 224 (208-233); tail, 65 (60-68); hindfoot, 30 (30-31); basilar length, 36.1 (32.8-38.2); and zygomatic breadth, 26.5 (23.3-28.7). The allotype measures as follows: total length, 198; tail, 55; hindfoot, 27; basilar length, 32.6; zygomatic breadth, 24.0; least interorbital constriction, 6.7; mastoidal breadth, 19.1; length of nasals, 11.9; breadth of rostrum, 7.8; length of rostrum, 15.3; alveolar length of maxillary tooththrow, 7.6; and palato-frontal depth, 13.5. The females, including the allotype, give average, minimum, and maximum measurements as follows: total length, 208 (198-214); tail, 63 (48-76); hindfoot, 28 (26-30); basilar

length, 32.8 (30.8-34.4); and zygomatic breadth, 23.5 (22.2-24.7). The skulls are large and massive, with spreading zygomatic arches.

In pelage color, *T. b. caneloensis* most resembles *T. b. proximus* from Ramsay Canyon, 5,500 and 5,700 feet, Huachuca Mountains. The expressed pigment on the back is closest to Sayal Brown; the sides are between Clay Color and Cinnamon. The dorsum has varying amounts of dark coloration, the dark colors being more evident in worn pelage than in fresh pelage. One specimen (KU no. 51781) is unusual in having a posteriorly widening, deep black, median dorsal stripe.

Comparisons.—From *T. b. proximus*, *T. b. caneloensis* differs in: larger skull size; heavier and more spreading zygomatic arches; less inflated but larger braincase; and wider rostrum. From *T. b. modicus*, *caneloensis* differs in: less-inflated braincase; and darker pelage color. From *T. b. alienus*, *caneloensis* differs in: larger braincase; and darker pelage color.

Remarks.—This form is known only from the type locality. Gophers referable to *caneloensis* were obtained in deep soil in a grassland-oak swale.

Specimens examined.—Total, 12: Santa Cruz County, Arizona; Huachuca Mountains, west foothills, Canelo, 10 miles south of Elgin, 5,100 feet (KU).